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With no previous training in data processing, a teacher can set up a computer scoring program for objective test materials that will save many hours of manual work in test correction, scoring, ranking, and item analysis. Teachers, school administrators, and counselors can employ statistical information contained in computer printout sheets to plan and modify the curriculum, to counsel and place students, and to confer with parents. (TI)

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A COMPUTERIZED TEST-CORRECTING SERVICE FOR TEACHERS

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One of the continuing problems in education is the difficulty teachers have of coming up with defensible class grades for students. We will steer clear of the controversy of grading versus non-grading as well as the hassle about convergent and divergent thinking as measured by the objective and essay-type test. We are also aware of the many factors in addition to objective testing that go into the make up of a grade.

The purpose of this study is to show how one teacher without previous training in data processing was able to set up a program of computer scoring of objective test material that has already saved many clock hours of time for teachers.

Most schools now have access to some kind of computer service, but many teachers still register everything from surprise to fright at the mention of data processing. Many teachers need some briefing in order to make use of the computer service available to them and some need reassurance

that once a computer gets its metallic foot in the door, it will not take over.

A little orientation will help a teacher to realize that test correction, scoring, ranking, item analysis, etc., can be done in minutes by a computer as compared to hours if the work is done manually. This time saved can then be used for more creative preparation or anything else on the agenda.

Not only is the teacher benefited in that a vast amount of data is derived for him in minutes by the computer, but he is benefited by being able to keep complete score profiles on both individual students and on various classes. In addition, if a teacher is teaching several sections of the same kind of class, say four sections of college preparatory United States history, he can combine all four sections to constitute a population and each section can be treated as a sample of that population. This treatment allows a teacher to obtain information about each individual member of the population, about each class in comparison with the other classes, and about the population itself. This test-data can also be used in establishing local norms in any academic area.

Data processing is of value to others besides teachers, however. The school administration and counselors, the parents, and perhaps most importantly of all, the students

themselves are benefited by data-processing. The Administration and counselors can employ the data derived from the project in planning and modifying the curriculum, in pupil selection and counseling, and in parent conferences. Parents benefit from such a program because they are given statistically valid information about their children's progress in their classes. Students can, when made aware of certain basic statistical concepts such as the T-score, the normal curve of distribution, etc., appreciate the "objective" nature of data-processing, and can record and plot their own test results in statistically valid terms. Students learn to value the standard score because it gives them a certain security about the objectivity of test scoring. Students also learn to recognize class performance as a whole as well as their particular performance within the class.

The data-processing equipment used in the project consisted of an International Business Machine model 1401-12K Advanced Programmer with all-sense switch, 21311 disc drives, 1402 reader and punch, and 1403 Model 2 printer. This equipment was used in conjunction with International Business Machine Fast Cards Form A (IBM L56776) and Student Identification Cards (IBM L55756) to obtain the data recorded on print-out sheets. Two different print-outs containing different information were obtained.

The Part One print-out sheet contained the following

information:

1. The number of examinees or N.
2. The mean.
3. The standard error of the mean.
4. The mean deviation.
5. The standard deviation.
6. The variance.
7. The quartiles.
8. The median.
9. The mode (s).
10. The raw scores.
11. The percentiles.
12. The Z-scores.

The Part Two print-out consisted of three elements. The first element was a complete roster sheet containing the following information:

1. Student names in alphabetical order.
2. The percent of the questions answered correctly.
3. The absolute number of questions answered correctly.
4. The absolute number of questions answered incorrectly.
5. The absolute number of questions not answered.
6. A complete listing by number of all the questions answered and showing the exact response in terms of choices that the examinee made.
7. A legend indicating the symbols used to designate a correct response, an incorrect response, no answer, a too light a mark-sensing mark on the student answer card, and a more-than-one answer response.

The second element was a simplified frequency distribution plot showing the number of questions in the examination, the number of students making any certain score, and a symbolic plotting of the frequency of scores. This print-out sheet does not contain the amount of information that is contained in Part One but it is of value for bulletin board

displays for student use.

The third element is a print-out sheet containing item analysis information. This print-out prints the questions in number form, the choices available for the question, the student responses, the percent of correct responses, the valid scores, and the number of students tested. This print-out is valuable in assessing the quality of the question in terms of its difficulty. The even-numbered questions are listed on one half of the print-out while the odd-numbered questions are listed on the other half. It is very easy to determine how many responses to each question were selected by the examinees. By using the statistical information contained in both the roster print-out and the item analysis print-out a very complete and accurate item analysis can be performed yielding both the difficulty level and the discrimination power of each question.

As can be readily appreciated, the amount and character of the information derived from the data-processing equipment can be of great use to the classroom teacher. It should again be emphasized that this information is obtained almost instantaneously by a computer. It would be impossible to derive this same information short of hours of work if paper-pencil mathematics were used.

One concrete case illustrates the value of this system and alone justifies its utilization. In an Applied Arts

World History class it was observed that one student was making scores on objective tests which were, on the average, about two standard deviations above the mean for his class. The instructor of the class conferred with the student's counselor about the possibility of transferring the student into a college preparatory class. One of the major questions involved was whether or not the student would suffer in competition with college preparatory students. Fortunately, the same tests were used in both the Applied Arts classes and the College Preparatory classes, thus greatly facilitating an analysis of the data. In comparing the student's raw scores with identical college preparatory raw scores, it was observed that there were no significant changes with respect to the letter-grade averages (see Table One). That is to say, the student in question would have gotten, on the average, the same letter grade, plus or minus, in a College Preparatory class that he did get in an Applied Arts class. With parental consent, it was decided to transfer the student into a College Preparatory class at the end of the first quarter of the first semester of the 1968-69 school year. The student adjusted very well to the transfer and continued to score high on objective examinations. He scored about one and a half standard deviations above the mean in the College Preparatory classes. His letter grades did drop from A+ to A's and A- minuses, but, then, he had no significant competition in his

former class and, besides, he is still in the A category. He got an A for the semester's work and is at present in the A grade category.

Using the data in this way, students can be changed from one kind of class to another in accordance with the principle of doing what is most beneficial for the students.

The project of establishing the test-data service was considered successful and valuable for the services offered. The utilization of the data-processing equipment resulted in an enormous savings of man-hours, time which was used in bettering the instructional program. It is estimated that for the school year 1967-1968 at least 100 teacher-hours were saved in processing and grading objective examinations. Not only was this time saved for more valuable pursuits, but the statistical data obtained far surpassed that which would have been derived by paper-pencil means.

It is abundantly evident that the use of data-processing by secondary and primary teachers to serve their own special purposes need no longer be neglected. Both the equipment and the programming currently exist. The real demand is for imagination and innovation on the part of the teachers.

It can be projected that if this utilization of data-processing equipment is expanded to include all of the eight high schools in the Grossmont District, which is feasible

from the standpoint of the capacity of the data-processing equipment, a tremendous savings in time would be realized, to say nothing of the data accumulated or of the values derived from the use of standard scores. There is no question that technological advances pose both a threat to man and a promise for man. If technology is used as a means to emancipate man from the drudgery of un-necessary labor, then science and engineering will have bestowed a truly wonderful gift to mankind. There is no reason that this gift can not be given to teachers in the classroom.

	Student X's Scores in Applied Arts Classes			Scores of College Preparatory Classes			
Test Titles	Raw	T	Let.	Raw	T	Let.	
Primitive Man	24	66	A	24	60	B+	
Greece & Rome	32	77	A+	32	69	A	
Middle Ages #1	43	74	A+	43	63	A-	
Middle Ages #2	33	76	A+	33	63	A-	
Middle Ages #3*	35	66	A	Same			
Renaissance & Reformation	25	65	A-	Same			
Absolute Monarchs & Nationalism	36	66	A	Same			
Democracy #1	61	67	A	Same			
Democracy #2	50	62	A-	Same			
Nationalism	41	65	A-	Same			

T-Score & Letter Grade Average in Applied Arts Class - 73.25/A+
T-Score & Letter Grade Average in College Preparatory Class - 65.16/A
Combined T-Score and Letter Grade Averages - 69.20/A
*This test and all following test data derived subsequent to student's shift to College Preparatory Class.

TABLE ONE